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## Editorial

## Special issue on the fifth European workshop on probabilistic graphical models (PGM-2010)

The European Workshop on Probabilistic Graphical Models (PGM) is a biannual event held since the year 2002. The workshop brings together researchers interested in all aspects of graphical models for probabilistic reasoning, decision making, and learning. The fifth PGM was held in Helsinki, Finland, on September 13–15, 2010.<sup>1</sup> The majority of the researchers attending the workshop were from European countries but we received several contributions also from outside Europe: Canada, USA, and Australia.

The number of submissions to the workshop was 57. The papers went through a rigorous reviewing process, where each submission was reviewed by at least three members of the programme committee or additional reviewers. Of the 57 submissions, 36 were accepted for presentation at the workshop, where each accepted paper was given a slot both in a plenary and in a poster session taking place on the same day as the talk. All the accepted papers are available in the workshop proceedings [1]. Based on the reviewer feedback and recommendations by the session chairs, the program chairs invited the authors of 11 papers to submit extended versions to this special issue. We received nine submissions, which all went through a full review process according to the IJAR standards. Each paper was reviewed by 2–3 reviewers.

The accepted papers appearing in this special issue cover a wide range of topics relevant to the scope of the workshop. Different approaches to structure learning are studied in three papers. First, Lemeire, Meganck, Cartella, and Liu discuss adjacency faithfulness and present an extension of the well-known PC algorithm that is able to detect and cope with violations of faithfulness. Second, Roverato and Castelo use the so called generalized non-rejection rate to identify common edges in the network structure that reoccur under various experimental conditions. The merits of their method are demonstrated in the task of learning transcriptional regulatory interactions in molecular biology. Third, Hemmecke, Lindner, and Studeny focus on a geometric approach to Bayesian network structure learning. Their new vector representation of the network structure, called the characteristic imset, is shown to have several elegant properties and can be used as a basis for linear or integer programming methods aimed at structure learning.

Three papers are related to inference in graphical models. Ottosen and Vomlel look at the problem of finding optimal triangulations for efficient inference in Bayesian networks. Their new methods are accelerated by dynamic maintenance of the cliques in the graph and compares favorably to earlier approaches. Cano et al. discuss recursive probability trees that can be used to reduce the space required to store probabilistic graphical models and to reduce the computation time during inference. The authors present an algorithm for learning recursive probability trees and show that it produces good approximations with much smaller representations compared to earlier methods. Jensen and Gatti propose a technique called information enhancement to approximate optimal strategies in a decision-theoretic setting that can be used to reduce the computational cost of obtaining good decisions from influence diagrams.

Finally, two papers address topics related to sensitivity and robustness. First, Renooij presents an algorithm for sensitivity analysis in hidden Markov models (HMMs). The new approach is based on exploiting the recursive nature of HMMs. Choi, Xue, and Darwiche propose a measure called the same-decision probability for characterizing the confidence in decisions based on certain types of probability thresholds, and study its computational and other properties.

We hope that the papers will be found interesting and useful by all researchers in the area of probabilistic graphical models, and that the special issue succeeds in highlighting the excellent quality of the workshop contributions. The PGM workshops have established an important position in the graphical modeling community, and the number of submissions has been steadily increasing: in the forthcoming PGM 2012 workshop, to be held in Granada, Spain, there was again an increase in submissions by more than 20% from the previous workshop. This special issue as well as the past and future workshops

<sup>1</sup> <http://www.helsinki.fi/pgm2010/>.

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## Reference

- [1] P. Myllymäki, T. Roos, T. Jaakkola (Eds.), Proceedings of the Fifth European Workshop on Probabilistic Graphical Models (PGM-2010), HIIT Publications 2010-2.

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